

THE INVENTION CLAIMED IS:

1. A pinch valve for regulating fluid flow through a flush valve extending between a fluid inlet in connection with a source of fluid and a fluid outlet in connection with a plumbing fixture, the pinch valve comprising:

a cartridge member having a cartridge chamber wall extending between a fluid inlet opening and a fluid outlet opening and defining a cartridge chamber therebetween; and

a flexible sealing member positioned at least partially within the cartridge chamber and having a flexible wall with an inner surface defining a flow chamber extending between the fluid inlet opening and the fluid outlet opening of the cartridge member, and an outer surface defining a pressure chamber between the outer surface of the flexible wall and the cartridge chamber wall, wherein the flexible wall is adapted to constrict upon itself when a fluid force in the pressure chamber is at least equal to the fluid force in the flow chamber to close the flow chamber and prevent fluid flow therethrough.

2. The pinch valve of claim 1, wherein when the pressure chamber is relieved of pressure, the fluid force in the pressure chamber is less than the fluid force in the flow chamber, such that the flexible wall collapses, thereby permitting fluid flow through the flow chamber.

3. The pinch valve of claim 1, wherein the fluid inlet in connection with the source of fluid is in fluid communication with the flow chamber and the pressure chamber of the pinch valve.

4. The pinch valve of claim 3, wherein the cartridge member includes at least one fluid inlet channel extending therethrough for fluid flow into the pressure chamber.

5. The pinch valve of claim 4, wherein the fluid channel is a bleed opening having a diameter less than the diameter of the fluid inlet opening of the cartridge member.

6. The pinch valve of claim 5, further comprising a filter in operative communication with the fluid channel.

7. The pinch valve of claim 4, wherein the cartridge member further comprises at least one fluid outlet channel extending therethrough for fluid flow out of the pressure chamber.

8. The pinch valve of claim 7, wherein the fluid outlet channel includes a sealing member for sealing engagement to prevent fluid flow out of the pressure chamber.

9. The pinch valve of claim 8, wherein the plumbing fixture includes an actuation mechanism in operative communication with the pressure chamber, such that actuation of the actuation mechanism relieves the pressure chamber of pressure, reducing the fluid force in the pressure chamber to less than the fluid force in the flow chamber, such that the flexible wall of the flexible sealing member collapses, thereby permitting fluid flow through the flow chamber.

10. The pinch valve of claim 9, wherein the actuation mechanism includes a plunger in operative communication with the fluid outlet channel such that when the actuation mechanism is actuated, the plunger causes the sealing member to displace from sealing engagement with the fluid outlet channel to permit fluid flow out of the pressure chamber.

11. The pinch valve of claim 10, wherein the actuation mechanism further includes a handle element extending externally from the plumbing fixture and the plunger extends internally within the plumbing fixture and is in operative communication with the handle element, such that, when the handle element is actuated, the plunger is correspondingly actuated to displace the sealing member.

12. The pinch valve of claim 11, wherein the sealing member is a substantially spherical member configured to sealingly engage a corresponding opening in the fluid outlet channel.

13. The pinch valve of claim 12, wherein the sealing member is constructed from an elastomeric material.

14. The pinch valve of claim 1, wherein the cartridge member includes a rim portion having an undersurface configured to engage with an upper edge of an inside chamber of the plumbing fixture.

15. The pinch valve of claim 1, wherein the flow chamber is in fluid communication with a basin.

16. The pinch valve of claim 1, wherein the plumbing fixture is one of a toilet and a urinal.

17. The pinch valve of claim 1, wherein the flexible sealing member comprises an elastomeric material.

18. The pinch valve of claim 1, wherein the flexible sealing member is attached to the cartridge member through an attachment mechanism.

19. The pinch valve of claim 18, wherein the cartridge chamber is further defined by an upper annular rim adjacent the fluid inlet opening and a lower annular rim adjacent the fluid outlet opening, wherein the cartridge member further comprises an upper clamping member including a fluid channel extending therethrough and in fluid communication with the fluid inlet opening of the cartridge chamber, the upper clamping member configured to engage the cartridge chamber wall and abut the upper annular rim, and wherein the cartridge member further comprises a lower clamping member including a fluid channel extending therethrough and in fluid communication with the fluid outlet opening of the cartridge chamber, the lower clamping member configured to engage the cartridge chamber wall and abut the lower annular rim.

20. The pinch valve of claim 19, wherein at least a portion of a first end of the flexible sealing member is clamped between the upper clamping member and the upper annular rim and at least a portion of a second end of the flexible sealing member is removably clamped between the lower clamping member and the lower annular rim, thereby securely positioning the flexible sealing member within the cartridge chamber.

21. The pinch valve of claim 19, wherein the upper clamping member and the lower clamping member are threadedly engaged with corresponding threaded portions of the cartridge chamber wall.

22. A flush valve for a plumbing fixture comprising:

- a) an inlet chamber in fluid communication with a fluid source;
- b) an outlet chamber in fluid communication with a plumbing fixture; and
- c) a pinch valve for regulating fluid flow between the inlet chamber and the outlet chamber, said pinch valve comprising:

a cartridge member having a cartridge chamber wall extending between a fluid inlet opening in fluid communication with the inlet chamber and a fluid outlet opening in fluid communication with the outlet chamber, the cartridge chamber wall defining a cartridge chamber therebetween; and

a flexible sealing member positioned at least partially within the cartridge chamber and extending between the fluid inlet opening and the fluid outlet opening of the cartridge member, the flexible sealing member having a flexible wall with an inner surface defining a flow chamber extending between the fluid inlet opening and the fluid outlet opening of the cartridge member, and an outer surface defining a pressure chamber between the outer surface of the flexible wall and the cartridge chamber wall, wherein the flexible wall is adapted to constrict upon itself when a fluid force in the pressure chamber is at least equal to the fluid force in the flow chamber to close the flow chamber and prevent fluid flow therethrough.

23. The flush valve of claim 22, wherein when the pressure chamber is relieved of pressure, the fluid force in the pressure chamber is less than the fluid force in the flow chamber, such that the flexible wall collapses, thereby permitting fluid flow through the flow chamber.

24. The flush valve of claim 22, wherein the cartridge member includes at least one fluid inlet channel extending into the pressure chamber and at least one fluid outlet channel extending out of the pressure chamber.

25. The flush valve of claim 24, wherein the fluid outlet channel includes a sealing member for sealing engagement to prevent fluid flow out of the pressure chamber.

26. The flush valve of claim 24, wherein the inlet chamber is in fluid communication with the flow chamber through the fluid inlet opening of the cartridge member and with the pressure chamber of the pinch valve through the fluid inlet channel of the cartridge member.

27. A method of retrofitting a flush valve in a plumbing fixture comprising:

a) providing a flush valve comprising an inlet chamber in fluid communication with a fluid source and an outlet chamber in fluid communication with a plumbing fixture; and

b) inserting a pinch valve between the inlet chamber and the outlet chamber, said pinch valve adapted for regulating fluid flow between the inlet chamber and the outlet chamber and comprising a cartridge member having a cartridge chamber wall extending between a fluid inlet opening in fluid communication with the inlet chamber and a fluid outlet opening in fluid communication with the outlet chamber, the cartridge chamber wall defining a cartridge chamber therebetween, and a flexible sealing member positioned at least partially within the cartridge chamber and extending between the fluid inlet opening and the fluid outlet opening of the cartridge member, the flexible sealing member having a flexible wall with an inner surface defining a flow chamber extending between the fluid inlet opening and the fluid outlet opening of the cartridge member, and an outer surface defining a pressure chamber between the outer surface of the flexible wall and the cartridge chamber wall, wherein the flexible wall is adapted to constrict upon itself when a fluid force in the pressure chamber is at least equal to the fluid force in the flow chamber to close the flow chamber and prevent fluid flow between the inlet chamber and the outlet chamber.

28. A method as in claim 27, wherein the cartridge member includes at least one fluid outlet channel extending out of the pressure chamber with a sealing member for sealing engagement to prevent fluid flow out of the pressure chamber, and wherein the method further comprises aligning the fluid outlet chamber with an activation member of the flush valve such that the activation member is adapted for engagement with the sealing member upon activation thereof.

29. A method as in claim 27, further comprising the step of removing a diaphragm valve from the flush valve prior to the step of inserting the pinch valve.